UNITED STATES PATENT OFFICE

1,946,340

SPRING

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No Drawing. Original application October 10, 1930, Serial No. 487,920, and in Germany October 16, 1929. Divided and this application July 26, 1932. Serial No. 624,893

2 Claims. (Cl. 267—1)

This is a divisional application of application No. 487,920, filed October 10th, 1930, and relating to springs and method of producing the same.

It is generally known that the number of oscillations up to fatigue or fracture of springs, particularly leaf springs, is related with the properties of the surface of the springs. It is also known that small scores in the surface of springs such as occur due to rolled-in scales or grooves and small crevices of other types, give rise to points of incipient premature fatigue or fracture. It is further known that by etching or sand blasting such crevices can be flattened out whereby the fatigue and fracture of the springs is delayed and the life is thus somewhat extended.

The present invention resides in the discovery, that by a structural improvement of a very thin superficial layer on the surfaces of springs, the number of oscillations up to fatigue can be increased by 600–1000%.

This improvement may be described as compacting the said thin superficial layer or increasing the tensile strength of it. The compacting may further be described as such alteration of the thin superficial layer, as may be effected by a sand blast or similar means, and which is known as applied to other articles than springs and for other purposes. Obviously the optimum effect only occurs when other causes of fatigue such as crevices are either absent from the start or have been overcome by a separate process.

For this reason the compacting preferably is effected subsequent to other structural or microstructural improvement (for example by heat or mechanical treatment) of the springs, including the said removing of crevices and the like in the superficial layer, whereby a certain minor increase of the number of oscillations is produced.

Consequently it is further obvious that when a sand blast is used no sand of a sharp edge and coarse granuled nature is used since this would give rise to small indentations having the adverse effect hereinbefore mentioned.

That it is purely a matter of the effect of impacts is shown by the fact that the blasting can be carried out also with rounded steel particles of 1–2 mm. diameter and that these also are operative through a thin layer of scales. The relationship of the effect with respect to the usual sand blasting and etching is shown by the following example.

The leaves of a spring in the case of sand blasting and subsequent structural improvement resisted 50,000 vibrations, in the case of structural improvement and subsequent etching 60,000 vibrations and in a case of structural improvement and subsequent blasting 300,000 vibrations; also in the case of other springs in increase in the number of vibrations from 100,000 to 1,000,000 has been observed.

In many cases treatment in the sand blast for about 5 minutes is sufficient. The optimum time of treatment in individual cases can be readily determined for different types of spring and different materials by a few experiments.

A superficial difference with respect to the ordinary blasting with sand blasting for smoothing is to be seen in that for the latter a treatment of 5 seconds is adequate whereas for a good consolidation effect using the ordinary blasts and with the most usual types of spring the time of 20 seconds has been the minimum. The time depends naturally also upon the energy of the blast so that by improvements in this direction it may be shortened.

From the foregoing it follows that other modes of procedure which have the same effect as the sand blasting or steel particle blasting can be used for carrying out the invention; also if desired, an etching process could be used in conjunction with the new process.

The invention is particularly suitable for the load carrying springs of power vehicles.

What I claim is:—

1. A flat metal spring to be subjected to repeated bendings of substantial magnitude tending to produce fatigue having its surface layer compacted thereby having increased resistance against bending fatigue.

2. A flat metal spring to be subjected to repeated bendings of substantial magnitude tending to produce fatigue having its surface layers compacted and free of interconnected voids thereby having increased resistance against bending fatigue.

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